Lessons from the US Forest Service FHP SOD Program in CA

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Mescal Ridge

Photo by: Tom Coleman
Why this presentation?

- Forest Health Protection of State and Private Forestry of the USDA Forest Service has supported 200 + SOD projects in the past 15 years (these are year-long projects from $3,000 to $120,000/year)
- **10,000,000 $OD Dollars** have come from the Forest Service via S&PF-FHP;
- Objectives for the S&PF FHP SOD Grant Program have been: 1) to monitor the pathogen; 2) to promote understanding about the disease through extension; and (3) to manage the disease... and to do all these things in sync with COMTF.
- There have been several hundred collaborators in this effort. THANK YOU!!
- Science was used in picking projects and applied science lessons were learned up as projects were executed.
How we picked projects

• We have four criteria for picking projects; the most important is the likelihood of success, or, will the disease be better managed?

• Existing scientific evidence (both publications and researchers) was consulted regularly to see if a proposed project might be successful.

• We also received progress reports during the development of every project and took time to visit all projects. This allowed us to see what was working and what needed fixing.
SOD Arrives in California—approximately 1985

Shows up as an epidemic at Scott’s Valley, Saratoga, Mill Valley and China Camp from 1990-1995

In 2000 the causal agent is determined to be *Phytophthora ramorum*.

Aspects of the etiology of the disease are worked on from 2000-2008 (and ongoing).

because

“you have to know the biology of a disease (both the pathogen and the host) before you have a chance of managing it” abbreviated quote from Garbelotto et al 2003.
How *Phytophthora ramorum* operates

- There are many hosts; bay is a typhoid Mary kind of a host;
- The understanding of spore dispersal has evolved substantially; today estimates of dispersal distances are greater than initial estimates.
- One pathogen; two diseases;
- Foliar hosts (120 species)
- Bole canker (5 tree species)
Tan oak efficiently fills in voids
Point Reyes gets 1411 hours of fog each year (17% of all time in a year)
SOD Detection

• **Ground Surveys:** people on foot look for symptomatic vegetation and take samples

• **Aerial Detection:** people detect mortality consistent with disease from an aircraft

• **Stream Monitoring:** detects when pathogen is input—often from terrestrial infection—upstream of leaf baits
Monitoring aspects on the ground

• Look for bleeding cankers
• Look for infected leaves of bay
• Stream baiting
Aerial Detection of SOD
CLO often growing in drier parts of California than tanoak

Bonello group found some CLO have ample genetic resistance to SOD

Phytosphere showed that elimination of neighboring bays can help prevent infections that would lead to bole cankers (GTR Publication)

SOD Blitzes & Town Halls work: We don’t worry much about Coast Live Oak
Several management possibilities have been explored towards dealing with SOD in tanoak:

- Showing private land owners what they can do to avoid SOD
- Mapping to show areas of high, moderate and low risk
- Development of SOD Free Zones or Barriers
- Bay tree removal
- Phosphite (Agri-Fos)
- Increasing Spacing between trees
- Genetic resistance to the pathogen
- *In situ* gene conservation/ protection of sacred groves
- The management options for SOD on and near Tribal Lands are receiving lots of attention because of the importance of tanoak in Tribal cultures.
A SOD BLITZ IN ACTION.... WUI FOREST PATHOLOGY
Management Projects

- Valachovic, Redwood Creek
- Arguello, Redwood National Park
- Jones, Six Rivers Nat. Forest
- McGhee, Mattole Lost Coast
- Garbelotto, agrifos
- Sweicki, SOD management research and book.
- Kwasny, Los Padres Nat. Forest
- Bonello, Natural genetic resistance in live oak.
Evolution of concepts on what could constitute a successful barrier to spore travel

• A host free zone needs to be this distance away from an infected tree in order to keep a susceptible tree from getting its foliage or bole infected with *P. ramorum*

• 10 m
• One chain (approx. 20m)
• 100 m
• ¼ mile
• 3 miles
The VAN DUZEN NO-HOST ZONE

(¼ mile wide, 2 miles long)
Dominic Bongio Demonstrates Hack n’ Squirt Application $90.00/acre

Photo: Pete Angwin
REDWOOD CREEK SITUATION
The nursery connection; Thanks CDFA!!

West coast nurseries found to be infected with *P. ramorum* via nursery inspection/survey
CONCLUSIONS:
Much has been learned about managing SOD;

In California landscapes we have been playing catch-up too much of the time;

However, just a fraction of the potentially at-risk hosts have been killed to date;

Better prediction tools are now available;

A greater understanding of the tan oak’s value to native Americans has led to greater emphasis on tribal projects;

By choosing our battles and starting quickly we have better chances of managing SOD and being cost-effective;